

CLAIMS

What is claimed is:

1. A zoom lens system, comprising:
 - a lens barrel having a light tight circumferential outer surface, said lens barrel
 - 5 including a zoom guide rib on the inner circumferential surface of said lens barrel proximal to an image capture plane;
 - a first lens group located in said lens barrel distal from said image capture plane;
 - a second lens group, moveable independent of said first lens group, said second lens group slideably engaging said zoom guide rib;
 - 10 a bias member to engage said second lens group with said zoom guide rib during movement of said lens barrel; and
 - wherein the profile of said zoom guide rib is designed to move said second lens group linearly along an optical axis relative to said first lens group upon rotation of said lens barrel.
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2. The zoom lens system of claim 1, wherein the profile of said zoom guide rib is contoured in steps.
3. The zoom lens system of claim 2, wherein the profile of said zoom guide rib
- 20 provides for at least four discrete zoom lens step positions.
4. The zoom lens system of claim 1, wherein said lens barrel additionally comprising a pair of guide track shoulders on the inner circumferential surface thereof, said pair of guide track shoulders forming a guide track therebetween distal from said film end,
- 25 and wherein a portion of said first lens group rides in said guide track.
5. The zoom lens system of claim 4, wherein the profile of said zoom guide rib is contoured in steps and wherein said guide track includes a stepped portion coordinated

with at least one of said zoom guide rib steps.

6. The zoom lens system of claim 1, wherein said bias member includes a spring.

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7. The zoom lens system of claim 6, wherein said spring is located between said first lens group and said second lens group, wherein, said spring maintains said second lens group biased against said zoom guide rib, based on the position of said first lens group.

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8. The zoom lens system of claim 7, wherein said spring is a compression spring and wherein said second lens group is biased against a front face of said zoom guide rib distal from said image capture plane.

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9. The zoom lens system of claim 7, further including a guide pin connected between and passing through said first lens group and said second lens group, said spring being located concentrically around said guide pin between said first lens group and said second lens group.

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10. An image capture device, comprising:
an image capture device housing;
a lens box fixed within said image capture device housing, said lens box including a plurality of helicoids located on the inner surface thereof;
a zoom lens, a portion of which is located circumferentially within said lens box, said zoom lens including,

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a lens barrel having a light tight circumferential outer surface including lens barrel helicoids on a portion thereof to mate with said lens box helicoids, said lens barrel additionally including a zoom guide rib on the

- inner circumferential surface of said lens barrel proximal to an image capture plane, wherein the profile of said zoom guide rib is designed to move a second lens group linearly along an optical axis relative to a first lens group upon rotation of said lens barrel;
- 5 a first lens group located in said lens barrel;
- a second lens group, moveable independent of said first lens group, said second lens group slideably engaging said zoom guide rib;
- a bias member to engage said second lens group with said zoom guide rib during movement of said lens barrel;
- 10 a drive train including a motor, said drive train engaged with said lens barrel to rotate said lens barrel axially and to drive said lens barrel linearly out side said housing; and
- wherein rotation of said lens barrel by said drive train causes at least a portion of said second lens group to follow said zoom guide rib to move said second lens group
- 15 linearly within said lens barrel.

11. The zoom lens system of claim 10, wherein the profile of said zoom guide rib is contoured in steps.

- 20 12. The zoom lens system of claim 11, wherein the profile of said zoom guide rib provides for at least four discrete zoom lens step positions.

13. The zoom lens system of claim 10, wherein said lens barrel additionally comprising a pair of guide track shoulders on the inner circumferential surface thereof, said
- 25 pair of guide track shoulders forming a guide track therebetween distal from said film end, and wherein a portion of said first lens group rides in said guide track.

14. The zoom lens system of claim 10, wherein said bias member includes a

spring.

15. The zoom lens system of claim 14, wherein said spring is located between said first lens group and said second lens group, wherein, said spring maintains said second
5 lens group biased against said zoom guide rib, based on the position of said first lens group.

16. The zoom lens system of claim 15, further including a guide pin connected between and passing through said first lens group and said second lens group, said spring
10 being located concentrically around said guide pin between said first lens group and said second lens group.

17. A lens group for use in a zoom lens system, comprising;
a lens holder, said lens holder including,
15 a lens holder body including a front face and a rear face, a first planar body edge and a second planar body edge both perpendicular to said front and rear faces, said first and second planar edges being separated on one side by a third edge and on the other side by a fourth edge, said third edge and said fourth edge additionally being perpendicular to said faces, said body further including an
20 aperture therethrough extending from said front face to said rear face;
a first retaining arm extending from said rear surface proximal to said first planar edge and curving around to extend substantially parallel to said rear face;
a second lens retaining arm extending from said rear surface proximal to said second planar edge and distal from said first planar edge, said second
25 retaining arm extending from said rear face and curving around to substantially extend parallel to said rear face;
a first zoom rib engaging projection extending from said first planar edge;
a second zoom rib engaging projection extending from said second planar

edge; and

a lens aligned with said aperture through said body, said lens being held in contact with said rear face by said first and second retaining arms.

5 18. The lens group of claim 17, wherein said first retaining arm extends from said rear face proximal to said third edge and is open to receive said lens proximal to said fourth edge and wherein said second retaining arm extends from said rear face proximal to said fourth edge and is open to receive said lens proximal to said third edge.

10 19. The lens group of claim 18, wherein said lens includes a first planar lens edge and a second planar lens edge, said first planar lens edge being aligned in said holder with said first planar body edge, said second planar lens edge being aligned with said second planar body edge.

15 20. The lens group of claim 19, wherein said lens includes a first radial lens edge and a second radial lens edge and wherein said third edge and said fourth edge include radial portions, said first radial lens edge being aligned with said third edge and said second radial lens edge being aligned with said fourth edge.

20 21. The lens group of claim 19 wherein said first planar lens edge includes a first wedge thereon and said second planar lens edge includes a second wedge thereon, wherein said first wedge engages said first retaining arm and said second wedge engages said second maintaining arm to maintain said lens against said lens holder body.

25 22. The lens group of claim 21, wherein said first zoom rib engaging projection includes a first guide pin bore therethrough and wherein said second zoom rib engaging projection includes a second guide pin bore therethrough.

23. The lens group of claim 22, wherein at least one of said first and second zoom rib engaging projections includes a frustoconical projection extending therefrom and centered around said guide pin bore.

5 24. The lens group of claim 23 wherein at least one of said first zoom rib engaging projection and said second zoom rib engaging projection extends from said first planar body edge or said second planar body edge at a non-right angle.

25. A zoom lens system, comprising:
10 a lens barrel having a light tight circumferential outer surface, said lens barrel including a cam track on the inner circumferential surface of said lens barrel;
 a first lens group located in said lens barrel in fixed relation to a first end of said lens barrel proximal to an image capture plane;
 a second lens group, moveable independent of said first lens group, said second
15 lens group slideably engaging said cam track; and
 wherein the profile of said cam track is designed to move said second lens group linearly along an optical axis relative to said first lens group upon rotation of said lens barrel.

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